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Comments on the IEPR Commissioner Workshop on the Role of Hydrogen in Californiaâ€™s Clean Energy Future

Additional submitted attachment is included below.

Kevin Barker
Senior Manager
Energy and Environmental Policy
555 West 5th Street
Los Angeles, CA 90013
Tel: (916) 492-4252
KBarker@socalgas.com

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Vice Chair Siva Gunda
California Energy Commission
Docket Unit, MS-4
Docket No. 21-IEPR-05
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: Comments on the IEPR Commissioner Workshop on the Role of Hydrogen in California's Clean Energy Future

Dear Vice Chair Gunda:

Southern California Gas Company (SoCalGas) appreciates the opportunity to provide comments on the June 21, 2022 California Energy Commission (CEC) IEPR Commissioner Workshop on the Role of Hydrogen in California's Clean Energy Future, which examined the important role that hydrogen can play to support California's clean energy transition. SoCalGas commends and supports the CEC's work in exploring how hydrogen and hydrogen blending can serve as a central pillar of the transition to a net-zero emissions economy; this is a clear indication of the critical role that clean fuels will play in the future energy system. We also acknowledge and appreciate the CEC's efforts to gather the input of a diverse set of viewpoints, including researchers, California utilities, businesses, and governmental organizations. SoCalGas continues to look forward to collaborating with all stakeholders in these efforts.

A recent press release from the Governor's Office of Business and Economic Development (GO-Biz) recognized a foundational point in the future role of hydrogen, underscoring the critical role of a co-funded hub in California, "[a] federally co-funded hydrogen hub in California would accelerate our collective transition to a carbon-neutral economy, creating the scale needed to drive down cost for businesses and consumers alike, all while creating high paying jobs. Near term hub activities will center on deep investments in electrifying port operations, goods movement, transportation, and energy system resilience."[1] SoCalGas strongly agrees with GO-Biz's statement and submits that hydrogen has the potential to offer increasingly important capabilities in supporting a reliable, resilient, and decarbonizing energy system. In addition, the gas system

[1] *See* California Formally Announces Intention to Create a Renewable Hydrogen Hub, GO-Biz, May 2022, available at: https://business.ca.gov/california-formally-announces-intention-to-create-a-renewable-hydrogen-hub/

infrastructure has the potential to facilitate the integration of hydrogen molecules as a resource in California's energy infrastructure. To that end, SoCalGas offers the following viewpoint on key aspects of hydrogen policy and infrastructure planning for the CEC and the California Independent System Operator's (CAISO) consideration.

Our comments focus on four areas: **(1)** SoCalGas is committed to safety as a top priority with regard to hydrogen blending and production; **(2)** Adoption of hydrogen across multiple end-use sectors in a coordinated fashion is critical to reaching decarbonization goals and creating a self-sustaining hydrogen economy in California; **(3)** SoCalGas is supportive of exploring multiple pathways of hydrogen production; and **(4)** Research and development of hydrogen technologies is the cornerstone for progress and should be supported in the hydrogen space.

(1) SoCalGas is committed to safety as a top priority with regard to hydrogen blending and production.

In this section, we also answer: *How is SoCalGas going about studying the issue of hydrogen leakage?* And *How is SoCalGas reflecting our hydrogen views in the State's planning process?*

The safety of our natural gas system, our employees and contractors who operate and maintain the natural gas infrastructure, our customers who rely on the system to serve their energy needs, and the public are foundational to SoCalGas. We have noticed the topic of hydrogen leakage discussed in recent months. It is crucial to make determinations based on objective and robust data to address concerns or issues. SoCalGas is engaged in research to understand the implications of hydrogen blending and pure hydrogen transportation on these safety outcomes and on pipeline infrastructure materials and components.

SoCalGas is participating with different research consortia and collaborative efforts to perform the research needed to maintain the safety, reliability, and integrity of the system. For example, the NYSEARCH project "Odor Detection Study for Blended Hydrogen (M2021-005)" is a study investigating natural gas odorants for detectability and recognizability when hydrogen, at various concentrations, is present. SoCalGas will assess the results of this study to determine any necessary adjustments of odorants when used with hydrogen to maintain the ability of employees and consumers to detect gas leaks. Odorizing gas for the detection of potential leaks is an important component of SoCalGas's safety plan. More information on the research projects that are underway is found in the SoCalGas 2021 Research, Development, and Demonstration (RD&D) Program Annual Report.[2]

SoCalGas is keenly interested in maintaining the highest level of system integrity for safety and environmental concerns. SoCalGas's research efforts have identified very little scholarship in the area of hydrogen leakage, with the most recent research suggesting that hydrogen and natural gas leak at similar rates in low pressure distribution systems, but that more research is warranted in

[2] *See* SoCalGas 2021 Annual Report, available at: https://www.socalgas.com/sites/default/files/2021%20SoCalGas%20RD%26D%20Annual%20Report.pdf

this area.[3] In addition, a recent report published by the Center on Global Energy Policy at Columbia University concludes that "[p]ipelines, including both dedicated hydrogen pipelines and natural gas blending systems, are the most important systems for hydrogen delivery. In and of themselves, these systems demonstrate a low risk of leakage."[4]

The transportation of hydrogen is not a novel concept, currently the United States has approximately 1,600 miles of hydrogen pipelines operating and owned by merchant hydrogen producers, and according to the United States Department of Energy (DOE), "[t]ransporting gaseous hydrogen via existing pipelines is a low-cost option for delivering large volumes of hydrogen."[5] Transportation of hydrogen is not new, but can be costly if not done through pipelines. SoCalGas understands that we must perform hydrogen-related activities safely, reliably, and with minimal leakage. We are confident that this can be achieved.

In the California Public Utilities Commission (CPUC) Integrated Resource Planning and Related Procurement (IRP) Processes proceeding, SoCalGas urged the CPUC to revise the definition of renewable hydrogen to better align with recent developments in federal law and state environmental goals to prevent premature restrictions on a nascent and developing technology that is integral to decarbonization efforts.[6] In addition, the California Air Resources Board (CARB) Scoping Plan helps inform the IRP process, and SoCalGas recently submitted comments highlighting the need for clean fuels like green hydrogen to support the need for flexible generation resources to support grid reliability. Further, SoCalGas recommended that CARB staff consider expanding decarbonization options for industries that have the capacity to utilize hydrogen and expand grid reliability testing to 2045.[7]

2) Adoption of hydrogen across multiple end-use sectors in a coordinated fashion is critical to reaching decarbonization goals and creating a self-sustaining hydrogen economy in California.

During opening remarks of the workshop, Fritz Foo, Advisor to CEC Commissioner McAllister, explained that the adoption of hydrogen in a planned and coordinated fashion matters a lot and pointed to the example of Europe, where hydrogen resource locations are comprehensively planned.[8]

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[3] *See* Hydrogen leaks at the same rate as natural gas in typical low-pressure gas infrastructure, Mejia et. al., Mar 2020, available at: https://www.sciencedirect.com/science/article/abs/pii/S0360319919347275?via%3Dihub

[4] *See* Columbia | SIPA, Center on Global Energy Policy, Hydrogen Leakage: A potential risk for the hydrogen economy, Fan et. al., July 2022, at p.5, available at: https://www.energypolicy.columbia.edu/research/commentary/hydrogen-leakage-potential-risk-hydrogen-economy?utm_source=Center+on+Global+Energy+Policy+Mailing+List&utm_campaign=86cf18b21c-EMAIL_CAMPAIGN_2019_07_22_06_27_COPY_01&utm_medium=email&utm_term=0_0773077aac-86cf18b21c-63736329

[5] *See* U.S. DOE Hydrogen Pipelines, available at: https://www.energy.gov/eere/fuelcells/hydrogen-pipelines

[6] Southern California Gas Company's (U 904 G) Comments To The Proposed Decision Adopting 2021 Preferred System Plan, Order Instituting Rulemaking to Continue Electric Integrated Resource Planning and Related Procurement Processes, Rulemaking 20-05-003, Jan 2022, available at: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M441/K160/441160389.PDF

[7] *See* SoCalGas Comment 660 for Draft 2022 Climate Change Scoping Plan (scopingplan2022) - Non-Reg, available at: https://www.arb.ca.gov/lists/com-attach/4450-scopingplan2022-BnUCZwFnV1sDZghn.pdf

[8] *See* AM Session Recording, IEPR Commissioner Workshop on Role of Hydrogen in California's Clean Energy Future – Zoom, available at:

SoCalGas agrees with this assertion and adds that an integrated hydrogen adoption strategy, which includes various end-use applications and coordination of introducing hydrogen into these end-use sectors, will provide potential synergies for all stakeholders -- regulated utilities, private and public companies, local, state, and federal organizations, and policymakers -- to make more informed decisions regarding hydrogen deployment.

To provide some informative international examples, the Humber industrial cluster in Yorkshire is the United Kingdom's (U.K.) largest cluster by industrial emissions, emitting 10 million tons of CO_2 per year, more than two percent of the U.K.'s total greenhouse gas (GHG) emissions.[9] Primary industries include steel, chemicals, cement, and oil refineries. Zero Carbon Humber (Humber) aims to establish the world's first net-zero industrial cluster by 2040 via the creation of Carbon Capture and Storage (CCS) infrastructure and the production of blue and green hydrogen. There will be three major areas of project work: (1) develop a carbon-capture usage and storage network; (2) produce low-carbon hydrogen and create shared hydrogen infrastructure; and (3) in the longer term, produce green hydrogen using offshore wind electrolysis.[10]

Hydrogen to Humber (H2H) Saltend will be the first mover utilizing the shared CO_2 and hydrogen transport and storage infrastructure.[11] This will eventually enable multiple carbon abatement projects in the region to scale quickly to achieve net-zero targets for the cluster, and U.K. industrial users will be able to reduce emissions by capturing carbon and transporting it via shared pipelines for offshore storage, as depicted in Figure 1 (below). Access to shared hydrogen infrastructure will spur demand for use as a feedstock in industrial processes, enabling the potential for further use outside the cluster and for hydrogen to be produced at scale, lowering overall costs. The industrial cluster is also expected to protect 55,000 existing jobs in Humber and create 49,700 new jobs by 2027, while supporting apprenticeships and educational opportunities across the region.[12]

https://energy.zoom.us/rec/share/4QeqHU0jgIWJbAVVldqCqZ6lBJmWMDZf70PCyVl-r7LHVWfsL_xxdCD253JBku3H.Nar5A8XtT5r0k1dX

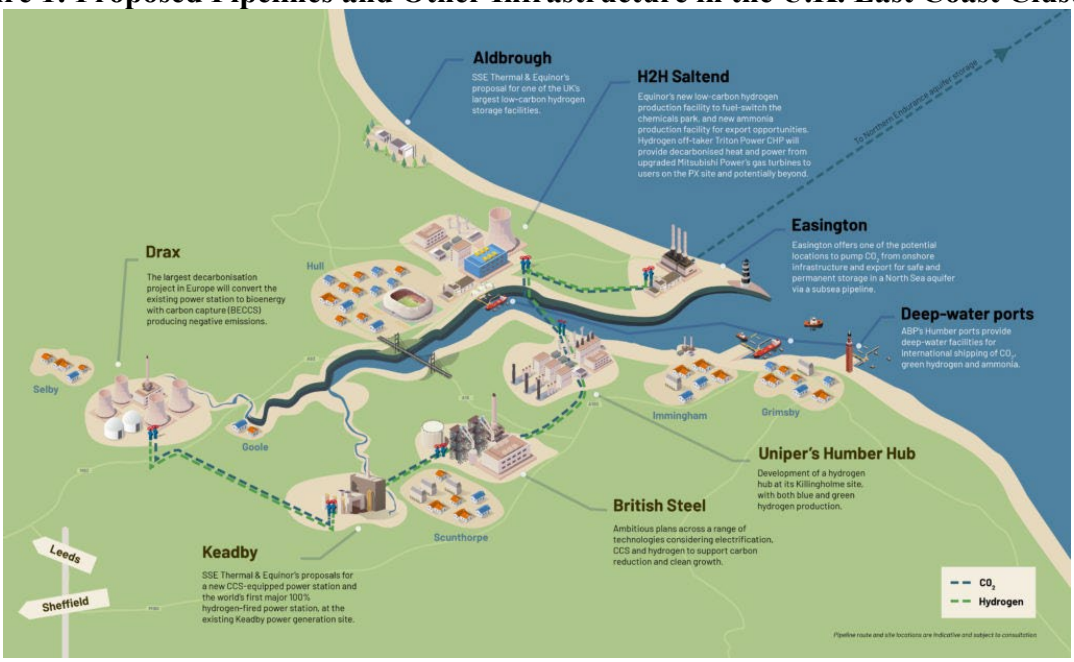
[9] *See* Industrial Clusters, Working together to achieve net zero, Accenture, p. 27, available at: https://www.accenture.com/_acnmedia/PDF-147/Accenture-WEF-Industrial-Clusters-Report.pdf.

[10] *See* Industrial Clusters, Working together to achieve net zero, Accenture, p. 28, available at: https://www.accenture.com/_acnmedia/PDF-147/Accenture-WEF-Industrial-Clusters-Report.pdf

[11] *Ibid.*

[12] *See* Industrial Clusters, Working together to achieve net zero, Accenture, p. 27, available at: https://www.accenture.com/_acnmedia/PDF-147/Accenture-WEF-Industrial-Clusters-Report.pdf.

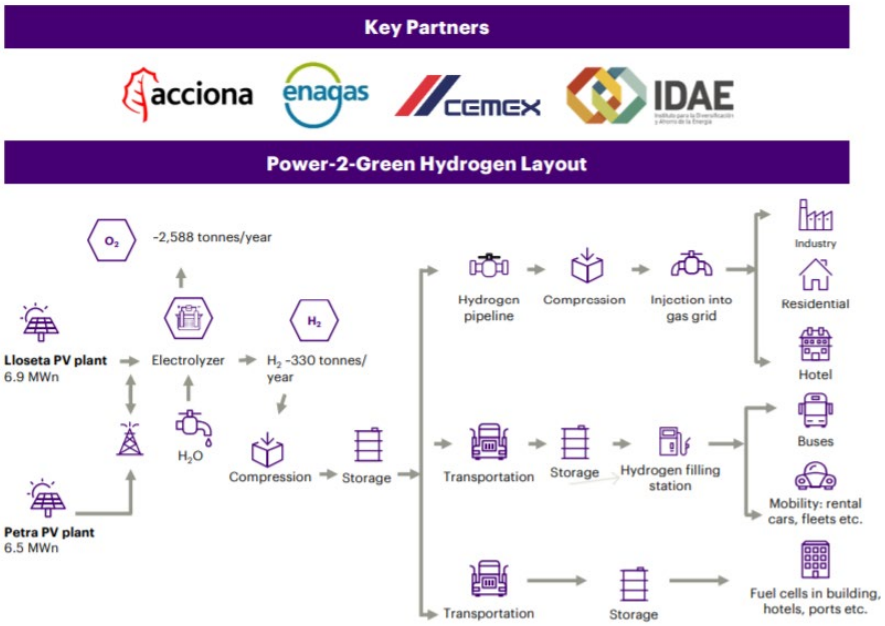
Figure 1: Proposed Pipelines and Other Infrastructure in the U.K. East Coast Cluster[13]



As another example, the Majorca Green Hydrogen, Power-2-Green Hydrogen project aims to pioneer a solution for island GHG emissions reduction and industrial reconversion on the island of Majorca, Spain.[14] Power-2-Green Hydrogen is planned as a revitalization project for the town of Lloseta in Central Majorca, which has been significantly impacted by the end of cement production, a major employer in the area.[15] The project consists of two solar PV plants making up more than 13 MW of combined generation capacity and a 2.5 MW polymer electrolyte membrane (PEM) electrolyzer.[16] The output from the electrolyzer will support multiple end-use applications: powering part of the island's public transportation fleet; green hydrogen injected into the gas grid to supply industrial parks; and providing backup energy for buildings (public buildings, ports, hotels, etc.). Figure 2 (below) shows the key partners for the project as well as an initial layout.

[13] *See* "What a Zero Carbon Humber would look like," available at: https://www.zerocarbonhumber.co.uk/.
[14] *See* Power to Green Hydrogen Mallorca, available at: https://www.acciona.com/projects/power-to-green-hydrogen-mallorca/.
[15] *See* Industrial Clusters, Working together to achieve net zero, Accenture, p. 62, available at: https://www.accenture.com/_acnmedia/PDF-147/Accenture-WEF-Industrial-Clusters-Report.pdf
[16] *Ibid.*

Figure 2: Green Hydrogen Schematic for the Majorca Cluster[17]



Finally, hydrogen hub research and development have important intersections with jobs, equity, and technological diversity within the State of California and have the potential to positively impact low-income and disadvantaged communities in which hard-to-abate sector activities are often located. Addressing research and development efforts to coordinate with federal funding to support a hydrogen hub in California will support real societal climate benefits, particularly for communities of concern.

3) SoCalGas is supportive of exploring multiple pathways of hydrogen production.

A rapid transition to hydrogen and increasing hydrogen availability will require the ability to produce hydrogen through multiple pathways. The California Air Resources Board in the Draft 2022 Scoping Plan Update (SPU) recognizes this need and does not establish limits on hydrogen production. Per the Draft SPU, transitioning from fossil fuel combustion to hydrogen will require the ability to produce hydrogen through electrolysis with renewable electricity and through steam methane reformation of renewable or fossil gas paired with CCS until such time as electrolysis with renewables can meet the ongoing need.[18] California should support multiple pathways of hydrogen production, including low carbon hydrogen production.

Carbon intensity is an important tool for distinguishing between the types of hydrogen produced and allows for more detail than a color-code system. Consistent with the Federal Infrastructure Investment and Jobs Act (IIJA), which seeks to establish a clean hydrogen strategy and roadmap for the United States, California should support the direction and scope of opportunities that

[17] *Ibid.*
[18] *See* CARB Draft 2022 Scoping Plan Update, published May 10, 2022, at page 69.

include clean hydrogen.[19] The IIJA establishes the federal statutory definition of clean hydrogen as "hydrogen produced with a carbon intensity equal to or less than 2 kilograms of carbon dioxide-equivalent produced at the site of production per kilogram of hydrogen produced," which is subject to the development of an initial standard for the carbon intensity of clean hydrogen production to be developed by the Secretary of Energy in consultation with the U.S. Environmental Protection Agency (EPA) and stakeholders within 180 days of enactment.[20]

Furthermore, the CEC recently awarded SoCalGas with a grant to pursue development of a novel hydrogen production system using biogas to create affordable, scalable, and renewable hydrogen.[21,22] Separately, SoCalGas also proposes to develop the nation's largest green hydrogen energy infrastructure system, the Angeles Link, to deliver green, electrolytic hydrogen in an amount equivalent to almost 25 percent of the natural gas SoCalGas delivers today.[23] A diversified and flexible hydrogen policy is in the public's interest regarding affordability, production streams, and deliverability.

4) Research and development of hydrogen technologies is the cornerstone for advancing progress and should continue to be supported in the hydrogen space.

SoCalGas believes that demonstration projects are critical to scaling up new technologies and identifying opportunities for hydrogen cost reduction. One example is a collaborative project recently announced between GKN Hydrogen, SoCalGas and the U.S. Department of Energy's (DOE's) National Renewable Energy Laboratory (NREL) to demonstrate an innovative green hydrogen storage solution.[24] GKN Hydrogen's HY2MEGA enables safe, long duration clean energy storage without the need for compression. At scale, this combined technology could provide resilient power in case of widespread outages. It also highlights the technologies needed to reach carbon neutrality and accelerate clean fuel initiatives. Two HY2MEGA hydrogen storage subsystems will connect to an electrolyzer and fuel cell on NREL's Flatirons Campus near

[19] *See* DOE Establishes Bipartisan Infrastructure Law's $9.5 Billion Clean Hydrogen Initiatives, DOE, available at: https://www.energy.gov/articles/doe-establishes-bipartisan-infrastructure-laws-95-billion-clean-hydrogen-initiatives

[20] 42 USC 16166 Sections (a) and (b).

[21] *See* Hydrogen Innovation: SoCalGas Awarded $750,000 California Energy Commission Grant to Develop Renewable Hydrogen from Biogas, Jun 8, available at: https://newsroom.socalgas.com/press-release/hydrogen-innovation-socalgas-awarded-750000-california-energy-commission-grant-to.

[22] The project will build upon innovations in modular hydrogen production technology to create a system powered by renewable electricity that can use renewable gas, such as biogas from landfills, wastewater treatment plants or dairy farms as a feedstock to produce low-cost clean hydrogen. Moreover, the system will produce hydrogen at a lower temperature, without needing combustion, thereby eliminating nitrogen oxide emissions. The project team expects to develop a bench-scale demonstration that is both modular and scalable, offering a flexible means of creating renewable hydrogen. This research aims to lower costs of producing renewable hydrogen to $1.39 per kilogram, comparable to the cost of producing hydrogen via more conventional means, while also reducing emissions by up to 95%. When powered by renewable electricity, the system will produce low-carbon or carbon-negative hydrogen and capture all the carbon dioxide co-product for use in CO2-based fuels, microalgae fuels and products and concrete building materials. The demonstration system will be designed to produce 5 kilograms of hydrogen per day. This is just an example of the many hydrogen production pathways that SoCalGas continues to support.

[23] *See* Angeles Link, Shaping the Future with Green Hydrogen, SoCalGas, available at: https://www.socalgas.com/sites/default/files/Angeles-Link-Fact-Sheet_0.pdf

[24] *See* GKN Hydrogen, SoCalGas and the National Renewable Energy Laboratory agree to collaborate on the launch of an innovative hydrogen storage solution project, available at: https://newsroom.socalgas.com/press-release/gkn-hydrogen-socalgas-and-the-national-renewable-energy-laboratory-agree-to

Boulder, Colorado.[25] The electrolyzer will use renewable sources and produce green hydrogen to be stored in the HY2MEGA units. The HY2MEGA system stores the hydrogen in a solid state (metal hydrides), under low pressure in a compact footprint. According to GKN Hydrogen, this is one of the safest ways to store hydrogen. The fuel cell will then convert the green hydrogen to renewable electricity. The two HY2MEGA units will add 500 kgs of hydrogen storage capacity on site. The three-year project is set to launch at the end of this year.[26] SoCalGas commends such pilots and innovative projects that reveal the potential to reduce hydrogen costs, which would encourage the broad adoption of this clean fuel over time.

Conclusion

As we collectively pursue decarbonizing California's energy system, it is imperative that we consider the public interest; policymakers, market participants, and stakeholders should collaboratively prioritize and help scale clean hydrogen as part of a balanced portfolio of clean energy resources in California. SoCalGas looks forward to contributing to and advancing those efforts by working with the CEC, CAISO, and similarly focused agencies to define solutions for leveraging the fuel system and enabling the future decarbonized energy system for all Californians.

Respectfully,

/s/ Kevin Barker

Kevin Barker
Senior Manager
Energy and Environmental Policy

cc:
The Honorable Patty Monahan, CEC Commissioner
The Honorable Andrew J. McAllister, CEC Commissioner
The Honorable Mark Rothleder, California ISO Chief Operating Officer

[25] *Ibid*.
[26] *Ibid.*